

Parana formation is truly of late Tertiary age, and may probably be correlated with the Pliocene of the northern hemisphere.

EXPLANATION OF PLATE I.

Teeth of Elasmobranch fishes from the Parana formation, Province of Entrerios, Argentine Republic.

Figs. 1, 1 a. *Odontaspis elegans*, Ag. ; outer and lateral aspects.

Fig. 2. Ditto; inner face.

Figs. 3, 3 a. Ditto; inner and lateral aspects.

Figs. 4, 5. Ditto; inner face.

Figs. 6, 6 a. *Oxyrhina hastalis*, Ag. ; outer and lateral aspects.

Figs. 7, 8. Ditto; outer face.

Fig. 9. *Carcharodon megalodon*, Ag. ; outer face, two thirds nat. size.

Figs. 10, 10 a. *Galeocerdo aduncus*, Ag. ; outer and inner faces.

Figs. 11, 11 a. *Hemipristis serra*, Ag. ; outer and inner faces.

The original specimens are in the National Museum, Buenos Aires, and all the figures except no. 9 are of the natural size.

II.—*The New Mexico Bees of the Genus Megachile and a new Audrena.* By T. D. A. COCKERELL, Professor of Entomology, New Mexico Agricultural College.

Megachile Wootoni, Ckll., 1898.

The type was a male. I have before me two females from the Rio Ruidoso, about 6900 feet, at flowers of *Verbascum thapsus*, July 23 (C. H. T. Townsend). They differ at once from the female of *M. calogaster* by having little or no black hair on the vertex and mesothorax; one has the orange scopa as in *calogaster*, but the other has the scopa orange in the middle and black at the sides, thus approaching *M. melanophæa*.

This belongs to the subgenus *Megachile* s. str., as restricted by Friese.

Megachile sapellonis, sp. n.

♀.—Length 17-22 millim., the shorter examples having the abdominal segments retracted.

Black, with rather thin pubescence, white on sides of face, cheeks, pleura, metathorax, femora, sides of first segment of abdomen, and hind margins of second and following segments, more or less interrupted in the middle, at least on

the second segment; vertex, mesothorax, and scutellum with erect black hair; basal portions of second and following abdominal segments with short black hair; labrum with erect pale orange hair; hair on inner side of tarsi more or less orange or reddish, on hind tarsi deep orange-ferruginous; ventral scopa entirely very pale yellowish to yellowish white, never quite a pure white; spurs bright ferruginous; antennæ wholly black, reaching about to tegulæ; clypeus shining, with strong punctures, sparse in the middle, its anterior margin with four short teeth; head large, subquadrate; cheeks simple; vertex broad, with strong punctures, dense in the middle, where they are of two sizes; mandibles broad, 4-dentate, not counting the inner angle; mesothorax densely punctured at the sides, more sparsely in the middle; tegulæ black, microscopically sculptured, punctured anteriorly; wings smoky; claws with a ferruginous denticle at the base.

Allied to *M. bucephala*, Smith, but considerably larger.

Hab. Beulah, Sapello Cañon, N. M., July 26, 2 ♀, one at flowers of thistle (*W. Porter*); Beulah, Aug. 18, 2 ♀ (*Ckll.*); hill west of Beulah, Aug. 23, 1 ♀ (*W. Porter*); Harvey's Ranch, 9600 feet, Aug. 22, 4 ♀ (*Porter & Ckll.*); South Fork, Eagle Creek, White Mts., about 8100 feet, at flowers of *Senecio Bigelovii*, Aug. 13, 1 ♀ (*Townsend*).

Greene, 'Pittonia,' iv. p. 118, announces that the plant of the White Mts., distributed as *Senecio Rusbyi*, is really *S. Bigelovii*. It is visited also by *Bombus improbus* and *Andrena apacheorum*.

Megachile pugnata, Say, 1837.

Santa Fé, 5 ♂, 2 ♀; Las Vegas, July 22, at flowers of *Rudbeckia laciniata*, 1 ♀ (*W. Porter*); Beulah, July 26, 3 ♀ (*W. Porter*); hill near Beulah, Aug. 19, 2 ♀ (*W. Porter*).

The female is easily distinguished from the last by its smaller size (not over 15 millim.) and the large tooth at the lower hind angles of the cheeks. The abdominal bands are entire.

The Santa Fé males were at flowers of *Lactuca pulchella* and *Rudbeckia*, the females at *Lactuca pulchella* and *Grindelia*.

Megachile fidelis, Cress., 1878.

Las Vegas Hot Springs, at flowers of *Senecio Douglasii*, Aug. 10, 3 ♀ (*W. Porter*); Burnt Cañon, Aug. 14, at flowers of *Cleome*, 1 ♀ (*Sarah L. Mize*); Las Vegas, July 6 and

19, at flowers of *Verbena*, 2 ♂ (*Porter & Ckll.*); July 7, at flowers of *Senecio Douglasii*, 1 ♀ (*W. H. Rishel*); Aug. 10, at flowers of *Grindelia squarrosa*, 1 ♀ (*S. L. Mize*); San Ignacio, Sept. 1, 1 ♀ (*Porter & Ckll.*); Beulah, July 26, 1 ♀ (*W. Porter*); west fork of Gila River, July 16, ♂ (*Townsend*); Rio Ruidoso, about 6500 feet, July 31 and Aug. 1, at flowers of *Heliopsis scabra*, 2 ♂ (*Townsend*).

The female differs at once from that of *pugnata* by the yellow abdominal bands and the large tooth or lamina on each side of the anterior margin of the clypeus.

Megachile exilis, Cress., 1872.

The male has the first three joints of the anterior tarsi flattened at the side. The female resembles the male; the ventral scopa is white, sometimes with a few black hairs at the extreme tip; in one specimen from the Rio Ruidoso the scopa on the last three segments is greyish brown; the anterior margin of the clypeus has two little teeth in the middle and a broad tooth or lamina at each side.

West fork of Gila River, July 12 to 16, many males (*Townsend*); Santa Fé, at flowers of *Pentstemon Torreyi* in a garden, crawling on the outside of the flower, July 11, 1 ♂ (*Ckll.*); Las Vegas Hot Springs, July 11, 1 ♂; Las Vegas, July 18, at flowers of *Lycium vulgare*, 1 ♀ (*W. Porter*); Gallinas River at La Cueva, at flowers of *Psoralea tenuiflora*, 2 ♀ (*Porter & Ckll.*); Rio Ruidoso, about 6700 feet, at flowers of *Vicia* near *pulchella*, July 29, 2 ♀, 6 ♂ (*Townsend*).

This species differs from most of its genus in not being addicted to the Compositæ.

Megachile occidentalis, Fox, 1894.

A narrow species, much like the last, but rather larger, and both sexes with two spots of white hair on the anterior part of the mesothorax. The female has the anterior margin of the clypeus with a broad but shallow median excavation, in the middle of which is a tooth; the ventral scopa is white, wholly black on the last segment.

Riley's Ranch, at base of Organ Mts., Aug. 26, 1 ♀ (*Ckll.*); Las Cruces, June 8, 1 ♂ (*Ckll.*); Mesilla, May 10, at flowers of *Prosopis glandulosa*, 1 ♂ (*Jessie Casad*); April 22, at flowers of *Phacelia*, 1 ♂ (*Ckll.*).

This is a species of the Middle and doubtless Lower Sonoran, whereas *M. exilis* belongs to the Upper Sonoran and transition zones.

Megachile latimanus, Say, 1823.

The female is easily distinguished by its rather large size (13–15 millim.), shovel-shaped abdomen, ventral scopa whitish at base, becoming ferruginous at apex, broad face, and the greyish-white pubescence of the vertex and mesothorax hardly at all mixed with black.

Santa Fé, July and August (*Ckll.*); Las Vegas, June 1, ♂, June 9, ♀ (*R. Devine*); July 6, at flowers of *Verbena Macdougali*, 1 ♀ (*W. Porter*); July 11, at flowers of *Cleome serrulata*, 2 ♀ (*M. Winters & Ckll.*); June 19, at flowers of *Medicago sativa*, 1 ♀ (*Ckll.*); Aug. 11, at flowers of *Petalostemon candidus*, 1 ♀ (*W. Porter*); Aug. 9, at flowers of *Grindelia squarrosa*, 1 ♀ (*W. Porter*); San Ignacio, Sept. 1, ♀ (*Porter & Ckll.*).

This is a species of the transition zone, and it is remarkable that it was neither found at Beulah nor in the White Mountains.

Megachile fortis, Cress., 1872.

This species in the male exhibits a dichroism like that of *Anthophora occidentalis*; the pale form is the *M. comata*, Cress., 1872, but in a long series it becomes impossible to recognize it as a separate species. The female has never been described as such, but from analogy with *M. latimanus* and the facts of distribution I feel certain that it is the insect described by Cresson in 1878 as *M. texana*. The male assigned to *texana* by Cresson is a different species.

This species inhabits higher altitudes than *M. latimanus*, though it also occurs in the transition zone. Las Vegas Hot Springs, Aug. 10, at flowers of *Senecio Douglasii* and *Verbena Macdougali*, 3 ♂ (*W. Porter*); Gallinas River, at La Cueva, Aug. 6, 1 ♂ (*W. Porter*); San Ignacio, Sept. 1, ♂ ♀ (*Porter & Ckll.*); Beulah, end of August, 1 ♀ (*Ckll.*); Mesquero Indian Reservation below the Agency, at flowers of *Bigelovia graveolens*, var. *glabrata*, Oct. 1 and 2, 7 ♀ (*Ckll.*); Rociada, Aug. 20, 1 ♀ (*W. Porter*); South Fork of Eagle Creek, 8000–8200 feet, Aug. 18–20, ♂ at flowers of *Heliopsis scabra*, ♀ at flowers of *Erigeron macranthus* and *Senecio Bigelovii* (*Townsend*); Rio Ruidoso, July 8, at flowers of *Pentstemon*, ♀ (*Wooton*); July 21–Aug. 3, 6500–7600 feet, males at flowers of *Verbena Macdougali* (some of these var. *comata*), *Vicia* near *pulchella*, *Monarda stricta*, *Heliopsis scabra*, *Astragalus humistratus*, and *Potentilla Thurberi*, but only single specimens on the last two; females at flowers of

Verbascum thapsus (very many), *Rhus glabra*, and *Verbena Macdougalii*.

Megachile relativa, Cress., 1878.

This and the next form a little group distinguished in the female by the ferruginous scopa, punctures of mesothorax relatively sparse in the middle, abdomen with hair-bands mostly interrupted, and the clypeus normal. *M. relativa* is rather small (about 11 millim.) and has the hair-bands of the abdomen white, overlapped with orange hairs, so as usually to appear yellowish or orange. In *monardarum* there are no overlapping hairs, unless it may be some black ones.

Rio Ruidoso, July 30, 1 ♀ (*C. M. Barber*); Rociada, Aug. 20, 1 ♀ (*W. Porter*); Harvey's Ranch, Aug. 22 (*W. Porter*); Beulah, July 26, Aug. 18, Aug. 25, many females, one at flowers of *Polemonium filicinum* (*W. Porter*).

The species evidently extends right across the northern part of the continent, as I have a female from Olympia, Washington State, at flowers of *Potentilla*, June 30 (*T. Kincaid*).

Megachile monardarum, sp. n.

♀.—Length 13–16 millim.

Similar to *relativa*, but differing in its larger size; the abdominal hair-bands (very broadly interrupted on the second and third segments, narrowly interrupted or entire on the fourth and fifth) white instead of orange; the black hairs on the dark parts of the abdomen longer, conspicuous at the sides when the abdomen is viewed from above; the vertex more sparsely punctured at the sides, and the two apical teeth of the 4-dentate mandibles perhaps not so long.

Hab. Hill near Beulah, Aug. 19 (*W. Porter*); Rio Ruidoso, 6500–6700 feet, at flowers of *Monarda stricta* and *Astragalus humistratus*, July 27–31 (*Townsend*).

Megachile pruina, Smith, 1853.

Our insect is *M. facunda*, Cress., now considered to be identical with *pruina*. The following records are based on the male, which is distinguished from the allied males flying in the same region by the simple anterior tarsi and the large teeth at the apex of the abdominal venter. It is a larger insect than *M. Townsendiana*, though variable in size (11–14 millim.), and does not have the emarginate apical

portion of the abdomen curved downwards as in that species ; but the two are closely allied.

Las Vegas Hot Springs, Aug. 10, at flowers of *Senecio Douglasii*, two (*W. Porter*) ; Las Vegas, July 22, at flowers of *Rudbeckia laciniata* (*W. Porter*) ; Aug. 9, at flowers of *Melilotus alba* (*W. Porter*) ; Aug. 12 (*A. Garlick*).

Megachile Townsendiana, Ckll., 1898.

Las Cruces, Aug. 23, 4 ♂ (*Ckll. & Townsend*) ; Rincon, July 6, at flowers of *Actinella*, 2 ♂ (*Ckll.*).

A species of the Middle Sonoran zone.

Megachile pollicaris, Say, var. *pereximia* nov.

♂.—Length 13 millim.

Anterior and middle femora and tibiæ ferruginous ; hind femora and tibiæ black ; middle tibiæ with a black basal streak behind ; anterior tibiæ yellow in front at apex ; second joint of anterior tarsus white, with a long linear apical process ; apex of flagellum somewhat dilated.

Hab. Beulah, May 30, at flowers of wild plum (*W. Porter*).

Megachile Casadæ, Ckll., 1898.

Found as yet only in the Mesilla Valley.

The female has the scopa entirely white ; clypeus and mandibles normal ; punctures of mesothorax large, the intervals between them shining, and presenting some extremely minute punctures.

Megachile soledadensis, sp. n.

♂.—Length 10 millim.

Agreeing with the description of *M. legalis*, Cress., but possessing the following peculiarities:—Eyes pale green ; apical joint of flagellum broad and flattened ; anterior coxæ with a bright ferruginous hair-patch, their spines short, oblique, pointed, and slightly curved ; anterior femora with the basal two fifths above pale ferruginous, beneath with a large yellowish keel, subtriangular in shape, like that of a racing-yacht ; anterior tibiæ three-sided, ferruginous, except on the outer side ; anterior tarsi yellow, moderately dilated, with a long white fringe, which is brownish within, second joint with a conspicuous black spot within ; hind tibiæ stout, their tarsi broadened ; hair of vertex and thoracic dorsum

slightly greyish, not at all mixed with black; tegulæ clear testaceous; wings nearly clear, costal nervure ferruginous; abdomen rather broad, but parallel-sided, clothed with greyish-white hair, hind margins of the segments with conspicuous entire white hair-bands; apex rounded, irregularly serrulate, not emarginate; apex of venter with a rather large tooth on each side and a small one in the middle.

Has the general aspect of *M. Townsendiana*, from which its front legs and abdominal structures at once separate it. The non-emarginate apex of abdomen allies it with *M. manifesta*, but it has not the long median ventral apical tooth of that insect.

♀.—Similar to the male, except for the usual sexual differences. Hind border of scutellum and sides of mesothorax conspicuously bounded by white pubescence; apical teeth of mandibles very little developed; ventral scopa white, black on the last segment.

Hab. Soledad Cañon, Organ Mts., Aug. 15, 2 ♂, 1 ♀ (*C. H. T. Townsend*); Mesilla Valley, at flowers of *Baileya multiradiata*, 1 ♂ (*Townsend*).

Megachile manifesta, Cress., 1878.

♂.—The abdominal bands, described as white by Cresson, are often ochraceous.

♀.—Similar to the male, except in the usual sexual characters, the broader more shovel-shaped abdomen, and the vertex and disk of mesothorax (but not the scutellum) being clothed with black hair. The abdominal hair-bands are entire and very distinct, and the second and following segments have their dark portions clothed with black hair. Ventral scopa white, black on the apical segment and apex of penultimate one, white, however, at extreme base of apical segment.

Las Vegas Hot Springs, Aug. 10, at flowers of *Senecio Douglasii*, 1 ♂ (*W. Porter*); Las Vegas, Aug. 9–14, at flowers of *Grindelia squarrosa*, 14 ♂, 3 ♀ (*S. L. Mize & W. Porter*); Aug. 11, at flowers of *Petalostemon candidus*, 1 ♀ (*W. Porter*). Apparently absent from the White Mountain region.

Megachile cleomis, sp. n.

♀.—Length 11–13 millim.

Pubescence mostly dull white, on vertex black, on mesothorax and scutellum thin, greyish white at the sides, black in the middle; on the middle of the second and following

abdominal segments black, very conspicuous at the sides when the abdomen is viewed from above; white pubescence dense on sides of face, pleura, tubercles, sides of metathorax, sides of first abdominal segment, and on hind margins of segments 1 to 5, forming conspicuous entire white bands; ventral scopa white or with a yellowish tinge, black on last segment; pubescence on inner side of tarsi dull ferruginous; clypeus ordinary, with strong punctures, well separated in the middle; antennæ short; vertex with large punctures; mesothorax microscopically tessellate, with large punctures, well separated on the disk; abdomen inversely mitre-shaped, strongly punctured; tegulæ black, punctured all over; wings dusky.

This agrees almost exactly with Cresson's description of the female *M. grandis*, but that is the female of *M. pollicaris*, which our insect certainly is not. Among the females found in New Mexico it is known by the white scopa, black on the last segment, normal clypeus, rather broad form, and the absence of any spots of white pubescence on the mesothorax or white band between the mesothorax and scutellum. The absence of the last-mentioned marks at once separates it from the superficially similar *M. sidulceæ*.

♂.—Length 11 millim.

Abdomen rather parallel-sided; antennæ long, last joint not modified; punctures of mesothorax closer; mesothorax and scutellum with scarcely any dark hairs; face densely covered with silky white hair; black hair on abdomen inconspicuous; cheeks simple; anterior coxæ armed with black spines of moderate length; anterior femora ferruginous beneath and with a ferruginous patch above; anterior tarsi simple, but fringed with white hair; margins of tegulæ more or less ferruginous; apex of abdomen emarginate, irregularly denticulate on each side of the emargination; apex of venter with three very short teeth.

This appears to be the male which Cresson supposed (erroneously, as I hold) to belong to his *M. texana*. It differs from that of *M. rufimanus* by the armed anterior coxæ.

Hab. Santa Fé, July 5–25, many males, one at flowers of *Cleome serrulata*, 1 ♀ (*Ckll.*); Las Vegas, June 28–July 20, both sexes numerous at flowers of *Cleome serrulata*, 1 ♀ at flowers of *Medicago sativa* (alfalfa), one of each sex at flowers of *Verbena Macdougali* (*M. Holzman*, *N. Stern*, *E. K. Rishel*, *A. Garlick*, *W. Porter*, *M. Winters*, *Ckll.*); Albuquerque. 1 ♀, June 30 (*Ckll.*).

Megachile cleomis, var. *lippiae* nov.

♀.—Always has two transverse white hair-marks at the front of the scutellum, but lacks the two marks at the front of the mesothorax, which are present in *M. sidalceæ*; scopa yellowish white, black on apical segment; mesothorax between the punctures dull; tegulæ more or less edged with ferruginous; flagellum sometimes a little ferruginous beneath; abdomen with less black hair at the sides.

♂.—Usually with more black hair on the thorax, especially on the scutellum.

This is the Middle Sonoran race of the species. La Cueva, Organ Mts., about 5300 feet, at flowers of *Lippia Wrightii*, Sept. 3-5, 2 ♂, 2 ♀ (*C. H. T. Townsend*); West Fork of Gila River, July 12-16, ♀ (*Townsend*); Las Cruces, ♀, Sept. 7 (*Ckll.*), and males as follows:—June 16, at flowers of *Aster spinosus* (*Ckll.*); Aug. 11 (*Townsend*); Sept. 4, at flowers of *Solidago canadensis*, var. *arizonica* (*Ckll.*).

The following males have no black hair on the scutellum, and offer no satisfactory differences from those of typical *cleomis*:—Las Cruces, Aug. 24, at flowers of *Solidago canadensis*, var. *arizonica*; Mesilla, July 4 (*C. M. Barber*); Mesilla Park, April 24, at flowers of *Onobrychis* (*Jessie Casad*); Fillmore Cañon, Organ Mts., Aug. 29 (*Ckll.*); Lone Mountain, July 7 (*Ckll.*).

The species is recognized in the male by the ferruginous patch on the upperside of the anterior femora.

Megachile sidalceæ, Ckll., 1897.

Described originally from the male. The subjoined records are based on the female, which is very similar to that of *M. cleomis* and is distinguished by the following combination of characters:—Ventral scopa pure white, black at extreme tip; a conspicuous white hair-band in the scutello-mesothoracic suture; two white hair-marks, converging posteriorly, on mesothorax in front; mesothorax microscopically tessellate between the punctures; borders of tegulæ more or less ferruginous; pubescence of face white, of vertex often mixed with black; clypeus and mandibles normal, anterior edge of clypeus smooth, often with a small median tubercle; abdomen mitriform.

Mesilla, May 13, two at flowers of *Prosopis glandulosa* (*Jessie Casad*); June 24, one at flowers of *Helianthus ciliaris* (*Ckll.*); Mesilla Park, two at flowers of *Isocoma Wrightii*, Sept. 11 (*Ckll. & Porter*); Las Cruces, Aug. 23 (*Ckll.*);

east of Las Cruces, about 4000 feet, two at flowers of *Senecio filifolius*, Sept. 10 (Townsend); Soledad Cañon, Organ Mts., one at flowers of *Pectis papposa*, Aug. 15 (Townsend).

The abdomen, viewed from above, does not show the black hair at the sides, which is so conspicuous in *M. cleomis*, except on the last two segments. This separates it at a glance from the typical female *cleomis*, but *cleomis* var. *lippiae* has conspicuous lateral black hair only on the last two segments, as in *sidalceæ*. It would be easy to regard *lippiae* and *sidalceæ* in the female as forms of one species, but the males are quite different in the structure of their anterior legs. There is a bare possibility that the female here assigned to *sidalceæ* does not belong to it, but is really a form of *lippiae*, in which case one of the next two species should probably be mated with *sidalceæ*; but in the absence of absolute proof I have followed the apparent probabilities.

Megachile prosopidis, sp. n.

♀.—Length $12\frac{1}{2}$ – $15\frac{1}{2}$ millim.

Resembling *M. sidalceæ* in the pubescence, but abdomen subcylindrical and parallel-sided; pubescence white, not hiding the surface except in particular places; the vertex and mesothorax have some very scanty and short dark hair, scarcely visible; pubescence dense, forming conspicuous white marks at sides of face, below tegulæ, two white marks on mesothorax in front converging posteriorly, a spot at lateral hind angles of mesothorax and on hind margins of abdominal segments, forming narrow entire bands; pubescence also dense on pleura and sides of mesothorax, but no well-defined band at the scutello-mesothoracic suture; band on first abdominal segment produced at each side into a triangular patch; scopa white, black on last segment; legs black; margins of tegulæ dull ferruginous; wings hyaline, slightly smoky on margins; antennæ black, flagellum faintly ferruginous beneath; mesothorax with large very close punctures, not at all sparse on disk; clypeus deeply and broadly emarginate, the sides of the emargination directed inwards, the middle occupied by a large lobe, so that the opening, if closed by an imaginary line connecting the opposite lower corners, would have a reniform outline; labrum with the apical lateral angles pointed, the apical middle thickened but not produced, bearing a brush of brown hairs directed somewhat backwards; mandibles broad, 5-dentate counting the inner angle, only the apical tooth large.

Allied to *M. rufimanus*.

Male unknown.

Hab. Mesilla, May 10, two at flowers of *Prosopis glandulosa* (*Jessie Casad*); Las Cruces, one (*Townsend*); Rincon, July 5, at flowers of *Chilopsis linearis*, one (*Ckll.*).

The maxillary palpi are covered with bristles.

Megachile chilopsidis, sp. n.

♀.—Length 14 millim.

In form, size, and pubescence just like *M. prosopidis*, so that, without looking at the face, one would take it for the same species, but clypeus and mandibles entirely different. Clypeus extremely short, produced in the middle into a very broad truncate lobe, more than twice as broad as long, projecting, shining and punctured above; labrum broadly truncate and thickened at end, the lateral corners pointed, the middle with a narrow brush of brown hairs directed obliquely backwards; mandibles long and narrow, somewhat broadened at apex, with three small teeth; a large open space between the mandibles and the clypeus. First joint of labial palpi shorter than in *M. prosopidis*, being not greatly longer than the second.

Male unknown.

Allied to *M. rufimanus*, which resembles this species in the mandibles, and the last more in the clypeus.

Hab. Mesilla, one at flowers of *Prosopis glandulosa*, May 13 (*Jessie Casad*); Rincon, one at flowers of *Chilopsis linearis*, July 5 (*Ckll.*).

Megachile populi, sp. n.

♀.—Length about 13 millim.

Black, with white pubescence; black on disk of mesothorax, middle of scutellum, and vertex, but in these places thin, wholly exposing the surface; hair of cheeks and sides of face long, dense, and pure white; antennæ short, hardly reaching to tegulæ, flagellum faintly ferruginous beneath; vertex strongly punctured, but the punctures separate; clypeus shining, strongly punctured at the sides, the punctures evanescent on the disk, anterior edge straight and normal; mandibles normal, 4-dentate counting the inner angle; first joint of labial palpi very broad, shorter than the second; mesothorax shining, though microscopically tessellate, densely punctured at the sides, sparsely in the middle; tegulæ

piceous, punctured all over; wings hyaline, faintly smoky; tarsi with ferruginous hair on the inner side; abdomen long-mitriform, the segments with entire white hair-bands; ventral scopa white, black on the last segment and sometimes the hind margin of the penultimate one.

There are no white hair-marks on the front of the mesothorax nor at the scutello-mesothoracic suture.

Superficially resembles *M. cleomis*, var. *lippiae*, but easily distinguished by the character of the mesothoracic punctuation and the much longer second joint of the labial palpus.

Hab. Mesilla Park, campus of New Mexico Agricultural College, April 16, cutting the leaves of *Populus*, to use in preparing their nests.

Megachile vallorum, sp. n.

♀.—Length 14–15 millim.

Much like *M. populi*, with the same kind of pubescence and entire white abdominal bands, but differing in many details. Black pubescence arranged on vertex, mesothorax, and scutellum as in *M. populi*; flagellum wholly dark or faintly reddish beneath; mandibles with prominent sharp teeth; second joint of labial palpus a little longer than first; clypeus with large punctures, dense all over; anterior border of clypeus with a broad shallow emargination, beneath which is a conspicuous fringe of orange hair; mesothorax densely punctured all over, the areas between the punctures wholly dull; no white hair-marks on anterior part of mesothorax nor at scutello-mesothoracic suture; tegulae dark, punctured all over; wings hyaline, broadly smoky on outer margin, and especially at apex; basal joint of hind tarsi long and flat, considerably longer than the other joints together, covered on inner side with orange-ferruginous hair; spines at apices of first four tibiae quite long, dark ferruginous; abdomen, viewed from above, showing abundant black hair at the sides of the last two segments, but not the others; ventral scopa white, varying to quite yellowish, black on last segment and apex of penultimate one.

By the clypeal structure allied to *M. montivaga*, but otherwise different.

Hab. Las Cruces (*Agnes Williams*); Mesilla, June 24, entering burrow in an adobe wall (*Ckll.*); Socorro, June 29, two at flowers of a species of *Compositae* (*Ckll.*).

Megachile heterodonta, sp. n.

♀.—Superficially, in size, form, and colour, even to the

tint of the abdominal bands and dark shading of the wings, exactly like *M. pugnata*, but differing as follows:—Cheeks not toothed; head not so large behind the eyes; middle of vertex with the punctures large and well-separated, the space between them shining, though microscopically tessellate; first joint of flagellum shorter; clypeus ordinary, densely punctured all over, with very large punctures, its anterior margin inconspicuously tridentate and fringed beneath with long orange hairs; mandibles stout, shorter than in *pugnata*, 4-dentate, the apical tooth long and pointed, the next truncate, the next quadrate, broader than long, with its inner corner somewhat produced, the innermost tooth short and pointed; mesothorax dull and as densely punctured as possible all over; ventral scopa white, black on last segment. The second joint of the labial palpus is conspicuously longer than the first. The abdominal bands are very distinct.

Hab. Las Vegas, Aug. 1 (*Porter & Ckll.*); Fillmore Cañon, Organ Mts., about 5700 feet, Sept. 1 (*C. H. T. Townsend*).

Megachile brevis, Say, 1837.

Hab. Gallinas River, at La Cueva, Aug. 6, 1 ♀ (*Porter & Ckll.*).

This agrees with *M. brevis*, received from Mr. Charles Robertson, and is the only genuine *brevis* in the New Mexico collections. The insect is recognized by its rather small size (11–12 millim.), wholly white ventral scopa, mesothorax dull and densely punctured, abdomen mitriform, mandibles curved at the apex, the two apical teeth close together.

I have the species also from Baldwin, Kansas, July (*J. C. Bridwell*).

Andrena sapellonis, sp. n.

♀.—Length $9\frac{1}{3}$ –11 millim.; ♂ about 8 millim.

With a wholly dark face and very long antennæ, the flagellum entirely black. In Robertson's table in Trans. Amer. Ent. Soc. xviii. p. 50, this runs to *A. salicis*, but it is a little larger, and differs from the description of the female by having the basal process of labrum narrow but quite large, produced, and rounded at the end instead of truncate; the well-developed hair-bands on the second, third, and fourth abdominal segments are white instead of fulvous. The clypeus, as in *salicis*, has a well-developed median impunctate ridge, and the long rather dense hair of the thoracic dorsum is ochreous, though that of the cheeks and pleura is white. The mesothorax is dull, microscopically tessellate,

with sparse punctures; the abdomen is impunctate. The anal fimbria is greyish brown. The enclosure of the metathorax is granular and ill-defined. Tarsi dark in both sexes.

I had thought it possible that this might be *Andrena trizonata* (Ashmead, as *Cilissa*), so I sent a specimen to Mr. Ashmead, who kindly compared it with his type, and reported as follows:—"The *Andrena* sent is not my *trizonata*, although it superficially resembles it. Your specimen is slightly larger, differently sculptured, and has quite a different pygidial plate. The hind legs and tarsi are also differently coloured. It is quite a different insect."

These remarks relate to the female; the male of *trizonata* is said to have a banded abdomen; that of *sapellonis* ♂ is shining, without bands, though the first segment, lateral hind margins of the two following, and whole hind margins of the rest are clothed with rather pale brown hair, which is only conspicuous under a lens.

The female *sapellonis* must resemble Robertson's recently described *A. salicacea*, but it differs from the description of the latter as follows:—Pubescence of thorax above ochraceous; facial grooves white, their width about as great as length of first flagellar joint; enclosure and sides of metathorax rugose-reticulate, but sculptured alike; anal fimbria pale brown. *A. sapellonis* agrees with *salicacea* in the process of labrum, proportions of the first three flagellar joints, fuscous pubescence on tibiæ, and third submarginal cell at least twice as long as the second. The two doubtless are closely allied.

Hab. Beulah, 4 ♀, 1 ♂ at flowers of *Salix*, 2 ♀ at flowers of wild plum, May 30, 1899 (*W. Porter*).

Mesilla Park, New Mexico, U.S.A.,
March 28, 1900.

III.—On the West-Indian Species of *Madrepora* *. By
J. W. GREGORY, D.Sc., F.G.S., Professor of Geology in
the University of Melbourne.

THE term *muricatum* was first applied to West-Indian corals

* [This paper was read before one of the London Societies in June last year after a visit to the West Indies to study, amongst other questions, the *Madrepore* of that region. The paper was withdrawn by request of the Society.

I delayed publication in order to reconsider the matter after a few months' interval. A recent letter from Mr. J. E. Duerden, of Jamaica,